

**REMARKS**

**I. Status and Disposition of the Claims**

Claims 1-9 were previously withdrawn by the Office as being directed to a non-elected invention, and are canceled in this Amendment. Claim 15 was previously canceled. By this Amendment, Applicants amend claim 10 to more clearly identify that which is claimed, and to add new dependent claim 29. New claim 29 further defines the process of claim 10 by reciting that this process additionally regulates the second fluid stream and the third fluid stream so that the second fluid stream and the third fluid stream have a flow volume that is less than about 10% of the average flow volume of the first fluid stream. Support for the amendments to claims 10 and 29 can be found, for example, at page 3, line 29 through page 4, line 3, at page 5, lines 25-31, and at page 9, lines 16-19 of the as-filed specification. Upon entry of this Amendment, claims 10-14, and 16-29 will be pending.

No new matter has been added by this proposed amendment nor does this amendment raise new issues or necessitate the undertaking of any additional search of the art by the Office. All of the elements and their relationships now claimed were earlier claimed in the claims as examined. Therefore, this Amendment under 37 C.F.R. § 1.116 should allow for immediate action by the Office. The proposed amendments, moreover, place the claims in condition for allowance or, at least, in better form for appeal, if necessary.

**II. Claims Rejections Under 35 U.S.C. § 102(a)**

Claims 10-14, 16-22 and 25 are rejected under 35 U.S.C. § 102(a) as being anticipated by U.S. Patent Publication No. 2002/0182465 to Okamoto ("Okamoto").

See Final Office Action at 2-4. According to the Office, Okamoto discloses a fuel cell stack vaporizer having a fuel reformer comprising a sensor and control valve, a cleanup unit comprising a sensor and controller, and a fluid conduit to the fuel cell having a pressure meter. *Id.* at pages 2-3.

The Office also concludes that the system of Okamoto is “capable of having a flow volume that is less than about 10% of the average flow volume of the first fluid streams during the operation of the fuel cell system.” *Id.* at page 3. Based on those assertions, the Office states that Okamoto anticipates the claimed invention.

Applicants respectfully disagree and traverse the rejection. Under § 102, a claim is anticipated only if each and every element of the claim is disclosed by the asserted prior art reference. M.P.E.P. § 2131. Here, Okamoto fails to disclose a control system wherein the regulation of at least one of the second or third fluid stream occurs with a time constant that is at least about three times greater than the time constant of regulation of the first fluid stream. Indeed, Okamoto expressly teaches a method using the same time constant for regulating all fluid inputs. For example, at paragraph [0057], after describing the complex algorithm used by the controller in regulating each of the inputs for each fluid in the system, Okamoto discloses:

The controller 100 performs the above processing repeatedly at a predetermined interval, e.g., a hundred milliseconds to one second depending on the performance of the controller 100.

Thus, the regulation of every input of every fluid in Okamoto occurs with the same time constant. Moreover, when the detailed description of the regulation of the various air inputs is examined, it is clear that the regulation of each input in the Okamoto system must have the same time constant. At paragraph [0036], Okamoto states that

The controller 100 controls the rotation speed of the compressor 11 so that the total air supply amount detected by the flowrate sensor 12 is equal to the total air amount supplied to the reformer 6, the carbon monoxide oxidizer 7 and the fuel cell stack 8.

Because the control system of Okamoto uses a single sensor to regulate the amount of fluid supplied to each of the three air inputs, the regulation of each of those inputs must occur with the same time constant.

Thus, the rejection of the claims under § 102 is improper because Okamoto fails to disclose a control system wherein the regulation of at least one of the second or third fluid stream occurs with a time constant that is at least about three times greater than the time constant of regulation of the first fluid stream, and Applicants respectfully request the withdrawal of this rejection.

### **III. Claim Rejections Under 35 U.S.C. § 103(a)**

#### **A. Rejection of Claims 10-14 and 16-28**

Claims 10-14 and 16-28 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication No. 2003/0186096 to Keskula et al. ("Keskula") and further in view of Okamoto. See Final Office Action at 4-9. As an initial matter, Applicants note that the Office admits that Keskula "fails to teach the fluid being water" (relevant to claim 23) and "fails to teach the fluid being fuel" (relevant to claim 24). *Id* at 9. Indeed, the Office relies on tertiary references, discussed in Sections III.B and III.C below to make up for these deficiencies. Accordingly, the rejection of claims 23 and 24 over Keskula in view of Okamoto should be withdrawn for this reason alone.

Turning to the remaining claims, according to the Office Kelskula discloses an air distribution method and controller for a fuel cell system comprising a fuel reforming unit

having a fluid inlet, a hydrogen-cleanup unit having a fluid inlet and a fluid conduit for providing fuel to the fuel cell. *Id.* at page 5. The Office states that the controller communicates with various mass airflow sensors to adjust the mass airflow controllers, thereby controlling airflow in the system. *Id.* Finally, the Office states that Keskula is inherently capable of having a flow volume that is less than about 10% of the average flow volume of the first fluid stream, because at start-up, the flow to the first input will be high, while the flow to the later inputs will be negligible. *Id.* at page 6. The Office concedes that Kelskula fails to teach a system with a sensor that is not an air flow sensor. *Id.* at page 7.

For that the Office turns to Okamoto, stating that the rate of air flow to the reformer is determined based on the detection temperature of a temperature system. *Id.* Based on that, the Office concludes that it would have been obvious for one of skill in the art to modify Kelskula with the teachings of Okamoto. Applicants disagree and traverse this rejection for at least the following reasons.

The Office bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. See M.P.E.P. § 2142. In *KSR Int'l Co. v. Teleflex Inc.*, 82 U.S.P.Q.2d 1385 (2007), the Supreme Court confirmed that the “framework for applying the statutory language of §103” is still based on its landmark decision in *Graham v. John Deere Co. of Kansas City*, 148 U.S.P.Q. 459 (1966). Under *Graham*, four factors are considered when determining whether an invention is obvious: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the art; and (4) secondary considerations. 148 U.S.P.Q. at 467. The obviousness or non-obviousness of the

claimed invention is then evaluated in view of the results of these inquiries. See *Graham*, 148 U.S.P.Q. 467; see also *KSR*, 82 U.S.P.Q. 2d at 1388. Implicit in this analysis is the requirement that the Office show that each and every element of the claims is disclosed in the prior art. M.P.E.P. § 2143.03.

As described above, Okamoto fails to disclose a control system wherein the regulation of at least one of the second or third fluid stream occurs with a time constant that is at least about three times greater than the time constant of regulation of the first fluid stream. Indeed, because the Okamoto system requires a single time constant for the regulation of all fluid lines, it actually teaches away from that element of the claims.

Keskula also fails to disclose a control system wherein the regulation of at least one of the second or third fluid stream occurs with a time constant that is at least about three times greater than the time constant of regulation of the first fluid stream. Like Okamoto, Keskula discloses a controller that requires the regulation of all fluid lines to occur with a single same time constant:

[t]he airflow controller 50 periodically polls the fuel cell subsystems 14 and requests the minimum air pressure that is required by each of the fuel cell subsystems 14. The fuel cell subsystems 14 provide the minimum required pressure . . . The airflow controller 50 controls the air pressure in the manifold 40 and/or tubing 22 to maintain the highest minimum required pressure for the fuel cell subsystems 14 until the subsequent polling period.

Paragraph [0024]. Thus, Keskula also teaches away from a control system wherein the regulation of at least one of the second or third fluid stream occurs with a time constant that is at least about three times greater than the time constant of regulation of the first fluid stream.

Because the combination of Okamoto and Keskula fail to disclose every element of the present claims, and because both of those references teach away from a particular element of the claims, the rejection over those two references under § 103 is improper. Applicants, therefore, respectfully request this rejection be withdrawn.

**B. Rejection of Claim 23**

The Office rejects claim 23 under § 103(a) over Keskula and Okamoto and further in view of U.S. Patent Publication No. 2003/0031902 to Balasubramanian et al. ("Balasubramanian"). See Final Office Action at 10. The Office applies Keskula and Okamoto in the same manner as they were applied to claim 10, but notes that those references fail to disclose the fluid being water. See *id.* For this the Office turns to Balasubramanian, stating that this reference teaches this element of the claim, and that it would have been obvious to the skilled artisan to combine the control system of Keskula and Okamoto with that of Balasubramanian.

Applicants respectfully disagree and traverse this rejection for at least the following reasons. As described above, the combination of Keskula and Okamoto fails to disclose every element of claim 10, and indeed both teach away from the element requiring a control system wherein the regulation of at least one of the second or third fluid stream occurs with a time constant that is at least about three times greater than the time constant of regulation of the first fluid stream.

Balasubramanian also does not disclose this feature. First, Balasubramanian fails to disclose the regulation of at least one of a second or third fluid stream with a time constant that is at least about three times greater than the time constant of regulation of a first fluid stream. Moreover, Balasubramanian is directed at maintaining

adequate amounts of water in the fuel cell system without the use of a condenser. It is not, however, directed at controlling the flow of water to the various components of the fuel cell system. In particular, it does not discuss regulating the rate of input of a first stream of a water into the fuel reforming unit; or regulating the rate of input of a second stream of the water into the hydrogen-cleanup unit; or regulating the rate of input of a third stream of the water into the fuel cell. Thus, Balasubramanian also does not cure the failure of Okamoto and Keskula to disclose a control system as presently claimed.

Because the combination of Keskula, Okamoto and Balasubramanian does not disclose every element of claim 10, or the additional element recited in claim 23, the rejection of claim 23 is improper. Applicants respectfully request that this rejection be withdrawn.

**C. Rejection of Claim 24**

The Office rejects claim 24 under § 103(a) over Keskula and Okamoto and further in view of U.S. Patent Publication No. 2002/0192517 to Beckmann et al. ("Beckmann"). See Final Office Action at 10-11. The Office applies Keskula and Okamoto in the same manner as they were applied to claim 10, but notes that those references fail to disclose the fluid being a fuel. See *id.* at 10. For this the Office turns to Beckmann, stating that this reference teaches this element of the claim, and that it would have been obvious to the skilled artisan to combine the control system of Keskula and Okamoto with that of Beckmann.

Applicants respectfully disagree and traverse this rejection for at least the following reasons.

As described above, the combination of Keskula and Okamoto fails to disclose every element of claim 10, and indeed both teach away from the element requiring a control system wherein the regulation of at least one of the second or third fluid stream occurs with a time constant that is at least about three times greater than the time constant of regulation of the first fluid stream. Beckmann also fails to disclose this element of claim 10. Instead, like Keskula and Okamoto, Beckmann discloses that "when a rapid increase in power demand is sensed by controller 24, the controller opens one or more of valves 32a-32c." Paragraph [0040]. Thus, the controller regulating the various branches of the fuel conduit uses the same time constant for regulating the fuel flow in each branch.

Because the combination of Keskula, Okamoto and Beckmann fails to disclose every element of claim 10, and because claim 24 depends from claim 10, the rejection is improper. Applicants, therefore, respectfully request this rejection be withdrawn.

#### **IV. Conclusion**

In view of the foregoing amendments and remarks, Applicants submit that this claimed invention, as amended, is neither anticipated nor rendered obvious in view of the prior art references cited against this application. Applicants therefore respectfully request entry of this Amendment under 37 C.F.R. § 1.116, the Examiner's reconsideration of the application, and the timely allowance of the pending claims 10-14, and 16-29.



Please grant any extensions of time required to enter this response and charge  
any additional required fees to Deposit Account No. 06-0916.

Respectfully submitted,

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